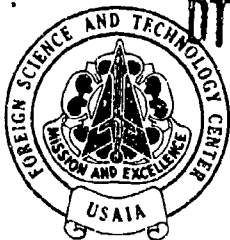


# UNCLASSIFIED

AD NUMBER
ADB126450
NEW LIMITATION CHANGE
TO Approved for public release, distribution unlimited
FROM Distribution authorized to U.S. Gov't. agencies and their contractors; Copyright; Specific Authority; 1 Jan 88. Other requests shall be referred to U.S. Army Intelligence Agency, Foreign Science and Technology Center, 220 7th St., N.E., Charlottesville, VA 22901-5396.
AUTHORITY
DFOISR/WHS/DOD ltr, 30 Nov 2001

THIS PAGE IS UNCLASSIFIED



DTIC FILE COPY

NOT EDITED

DEPARTMENT OF THE ARMY

US ARMY INTELLIGENCE AGENCY  
FOREIGN SCIENCE AND TECHNOLOGY CENTER  
220 SEVENTH STREET, NE.  
CHARLOTTESVILLE, VIRGINIA 22901-5396

FSTC-HT-0284-87

DATE: 6 Jan 1988



AD-B126 450

ENGLISH TITLE: From delta glider to airplane.

TRANSLATION OF: *Kryl'ya rodiny*. 1986. No. 9, 22-23.

LANGUAGE: Russian. COUNTRY: Union of Soviet Socialist Republics.

AUTHOR (AFFILIATION): No author.

REQUESTOR: AIFRBC (Gordon).

TRANSLATOR: CRH Associates.

200 005 499



TRANSLATION ACC #

DTIC  
ELECTE  
SEP 26 1988  
S E D

WARNING

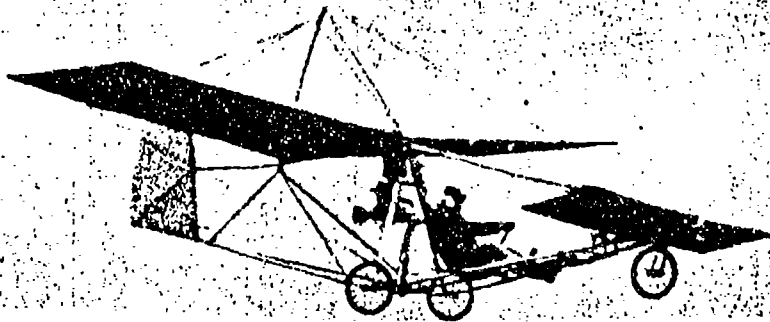
The contents of this publication have been translated as presented in the original text. No attempt has been made to verify the accuracy of any statement contained herein. This translation is published with a minimum of copy editing and graphics preparation in order to expedite the dissemination of information.

Distribution authorized to US Government agencies and their contractors  
(Specific Authority DODD 5230.25) (1 JAN 88).

Further requests for this document shall be referred to the US Army Intelligence Agency, Foreign Science and Technology Center, 220 7th St., NE., Charlottesville, VA 22901-5396.

DESTRUCTION NOTICE - Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

0 0 0 0 0 0 0 0 0 0



### FROM DELTA GLIDER TO AIRPLANE

✓ The flexible wing in the 1970's gained great popularity for aviation sportsmen. Then inventors installed a motor on the delta glider, extending the happiness of flight, in terms of feelings, close to that of a bird. The further development of such variants led to the creation of a more improved flying vehicle - ultralight, that is, an aircraft of a schematic tubular construction with a soft covering. Having preserved the main constructive principles of the delta glider, including the simplicity of assembly and disassembly, compactness in the collapsed form, the ULA "acquired" a higher aerodynamic efficiency. It became simpler in control, safer and, to a certain degree, more comfortable. Such vehicles have recently become wide spread.

... To the independent construction an engineer of the Kaunasskij factory of recreational goods "Ajdas", Gintautas Konchius became known even in 1974, soon after completion of the polytechnical institute. He started with the construction of a light helicopter with balance control. He made a self-made engine, transmission, a set of variants of blades. Together with his constant collaborator on all future constructions - a welder of the Kaunasskij radio factory, Piatras Shakalis, he fixed up the power system of the helicopter. But they still could not fly. The vehicle was too complicated for the young designers. At the same time they recognized that such an idea already had been patented in the USA,, and they dropped their interest in the helicopter.

In 1976 Gintautas and Piatras built one of the first delta gliders in Lithuania and soon they independently mastered flight from the steep shore of Neman. However the aerodynamic efficiency of the vehicle was 3-4 units, and flight lasted all of 20-25 seconds. After long considerations and not quite successful tests it became clear that a sufficient duration could be achieved only with the use of an engine. Thus after a certain time the original ultralight aircraft "Antis" appeared, aerodynamically designed on the well known, but little used at the time design of the "duck".

Using the carrying properties of the horizontal tail - the front wings, the inventors of the "Antis" reduced the size of the main and entire vehicle on the whole which showed up in an improvement of the flight characteristics. For the assurance of the a good directional stability the vertical tail - large control surface for turning was placed by the inventors behind on the separated frame.

They did not use a traditional aileron, having used for control in roll a twisting of the wings, like in aircraft at the start of the century. The vehicle turned out to be externally reminiscent of the "antique" flying vehicles of the Wright brothers era. *Superior Russian Aircraft Technology (S.R.A.T.)*

A production outboard engine "Vikhr'-25" with a power of 25 lps, with water cooling, was practically unchanged (a seldom encountered in domestic homemade products solution, usually cooling is provided by air). The designers removed everything superfluous, equipping the power system with a water radiator, a V-belt gear, and a muffler. They placed the motor behind the back of the pilot. It turns a slow speed, pusher, air propeller with a comparatively large diameter.

In terms of the easy disassembly and compactness in the collapsed form, the "Antis" satisfies the most rigid demands made on an ULA. A half hour is enough for a person to completely disassemble it and pack the parts in several packs which can be transported in a light automobile and stored in a common apartment. For complete assembly and preparation of the "Antis for flight", 30 minutes is also enough.

The first tests were conducted in 1981. The aircraft was very simple in control and stability. By report of the pilot M. Molchaniuk, who completed a flight of the "Antis" in "SLA-85" in Kiev, the piloting of the vehicle presented no difficulties, and the low speeds of the air flow, softly blowing in his face, and wonderful view, not limited by the fuselage and a window, leave a unforgettable impression of the flight. It is true, with a strong wind the vehicle, with a unit load for the wind of 15 kg/m<sup>2</sup> strongly reacts to each gust, which hinders the control. Those who build similar designs should consider that the limiting wind for operation is 5 m/s.

At "SLA-84" and "SLA-85" the "Antis" was recognized as the best ultra light aircraft in our country, and raised the interest in many specialists and enthusiasts. The vehicle caught the eye of geologists, foresters and cinematographers. After the flight of 1985 it was able to "take part" in filming of artistic films.

The design of "Antis" is simple and rational. The body of the wing is a rectangular planar frame, made duraluminum pipes 40 x 1.5. The rigidity and strength of it is assured by the system of cable braces. The covering can be made of dacron or the fabric "Iakhta" - materials well known to delta gliders. The profile of the wing is provided by laths made of thin duraluminum pipes, placed in the lath pockets in the covering. Approximately the same design is found on the front free hanging wing. For control in pitch it is completed by an all moving stabilizer, therefore on the aircraft there are no elevators.

The twisting of the wing is realized with the help of the back, bottom braces, connected with a lever. It must be noted that according to reports of the test pilots such a method of cross control is insufficiently effective and those who will repeat such designs are advised to find other variants for control of roll.

The aircraft does not have a fuselage as such. Its function is completed by the space truss. During the manufacture of the frames and trusses, used as the main semifinished item are duraluminum poles for jumps in height, purchased in the store "Sport-tovary [Sporting goods]" -D16T pipes with with a size of

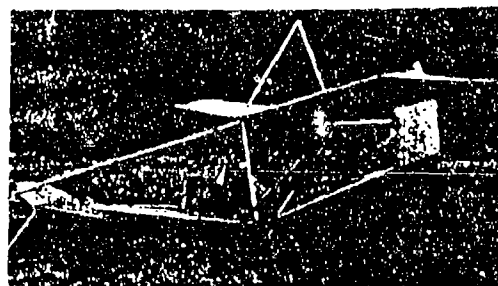
40 x 1.5 mm. Also purchased there were the wheels from a child's bicycle, the engine and many other elements of sporting -recreational equipment which became assemblies of the "Antis" construction:

1 - wheels from a collapsible bicycle with reinforced spokes; 2 - link for the control of the nose wheel; 3 - link for control of the stabilizer; 4 - fuel tank - canister of 10 liters; 5 - air propeller - birch, glued to fiber glass fabric; 6 - rear truss braces of the wing (diameter 3 mm); 7 - wing - negative twist of 3.5° and V shape of 5° are assured by the regulation of the truss braces; 8 - covering for fin, wing and stabilizer; 9 - truss for control of the rudder; 10 - pedals for control of the rudder; 11 - laths for the wing and stabilizer - D16T pipes 12 x 1 mm; 12 - water radiator; 13 - magneto - from a tractor [illegible]; 14 - shock absorber of engine mounting; 15 - muffler; 16 - pulley for starting engine; 17 - seating and sail lavsan.

TABLE OF PARAMETERS OF SECTIONS OF THE PROPELLER

a - section

	Сечение С				
		II	III	IV	V
H, mm	11.2	87	82	75.2	65.5
P, mm	43.8	34.6	29.3	22.5	15.3
M, mm	12.1	10.6	7.2	4.9	3.2
T, °	21	16.2	14	11.3	9
R <sub>n</sub> , mm	3.2	2.5	2	1.6	1.2
R <sub>s</sub> , mm	1.4	1.2	0.9	0.7	0.6
X, %	Y, mm				
5	13	8.25	7.5	5.6	4.2
10	18	12	10	7.4	5.8
20	19.8	14.9	12.1	9.4	7
30	21	15.7	12.5	9.5	7.2
40	20.8	15.5	12.2	9.4	7.1
50	19.3	14.8	11.8	9.1	6.7
60	16.9	13.6	11	8.3	6.5
70	14	11.6	9.3	7.1	5.4
80	10.6	9.1	7.8	5.4	4.4
90	6.8	6	4.5	3.5	3



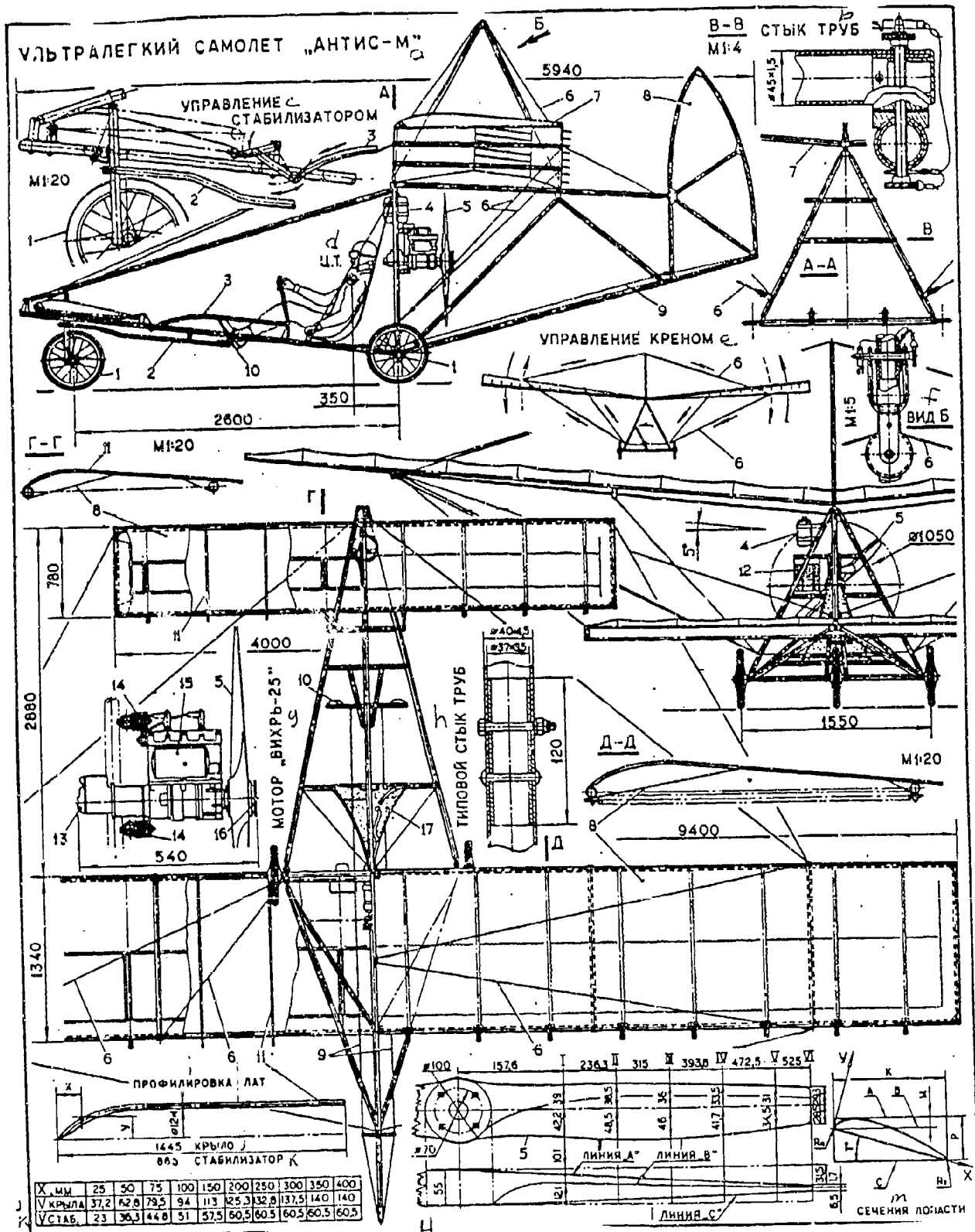
BASIC DATA FOR THE "ANTIS" AIRCRAFT

Length, m	6.0
Span of wing, m	9.4
Overall lifting surface area of wings, m²	15.3
Engine power, lps	25
Static thrust of propeller, kg	60
Engine rpm	5000
Propeller rpm	3100
Maximum speed, km/h	80
Stall speed, km/h	35
Maximally allowable speed, km/h	90
Climb rate from earth m/s	1.5
Weight empty, kg	100
Weight of pilot, kg	65-80
Flight weight, kg	165-180
Take-off run, m	20-30
Landing run, m	15-25
Maximum operational overloading	5



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input checked="" type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
C-2	

a - ULTRALIGHT AIRCRAFT "ANTIS-M"; b - joint of pipes; c - control of stabilizer; d - center of gravity; e - control of roll; f - type; g - Motor "Vikhr"-25; h - typical joint of pipes; i - Profile of laths; j - wing; k - stabilizer; l - line; m - section of blade





# DEPARTMENT of DEFENSE

Directorate for Freedom of Information and  
Security Review, Room 2C757  
1155 Defense Pentagon  
Washington, DC 20301-1155

---

## Facsimile Transmittal

30 November 2001

**To:** Mr. Larry Downing

Organization: DTIC  
Office Phone:  
FAX Number: (703) 767-9244

**From:** Sharon Reinke, Navy Division,  
DFOISR/WHIS/DOD

Phone: (703) 697-2716  
FAX: (703) 693-7341

Total Pages Transmitted (including cover sheet): 04

Comments: I am forwarding the FOIA request DTIC received, the DTIC forwarding letter, and a list of documents. The documents in the attached list have been released to a FOIA requester [under our case number 01-F-2458] and are, therefore, cleared for public release. If you have questions, give me a call.

# AMERICAN LAWYER MEDIA

105 MADISON AVENUE, NEW YORK, NY 10016  
212-779-9200

April 11, 2001

01-F-2458

Defense Technical Information Center  
Attn: Kelly Akers, FOIA Manager  
8725 John J. Kingman Road Suite 0944  
Fort Belvoir, VA 22060-6218

## FOIA REQUEST


Dear Ms. Akers:

American Lawyer Media respectfully requests, under the Freedom of Information Act, a copy of each of the following records:

- AD B253477, XV-8A Flexible Wing Aerial Utility Vehicle, by H. Kredit, January 1964, 144 pages
- AD B252433, Pilot's Handbook for the Flexible Wing Aerial Utility Vehicle XV-8A, March 1964, 52 pp
- AD B200629, Flex Wing Fabrication and Static Pressure Testing, by Larry D. Lucas, June 1995, 80 pages
- AD B198352, Materials Analysis of Foreign Produced Flex Wings, by Albert Ingram, march 1995, 16 pp.
- AD B131204, Active Flexible Wing Technology, by Gerald D. Miller, Feb. 1988, 256 pages
- AD B130217, Producibility Analysis of the Alternative Antitank Airframe Configuration Flex Wing, June 1988, 112 pages
- AD B126450, From Dela Glider to Airplane, June 1988, 5 pages
- AD B803668, Sailwing Wind Tunnel Test Program, September 1966, 125 pages
- AD 477 482, An Evaluation of Flex-Wing Aircraft in Support of Indigenous Forces Involved in Counterinsurgency Operations by R.A. Wise, Feb 1965, 74 pages
- AD 461202, XV-8A Flexible Wing Aerial Utility Vehicle, H. Kredit, Feb. 1965, 100 pages
- AD 460405, XV-8A Flexible Wing Aerial Utility Vehicle, Final Report, Feb. 1965, 113 pages
- AD 431128, Operational Demonstration and Evaluation of the Flexible Wing Precision Drop Glider in Thailand, by William R. Quinn, November 1963, 22 pages.
- AD 430150, Comparative Evaluation of Republic Bikini Drone System, Final Report, 1943?

We agree to pay up to \$200 for costs associated with this request. We are grateful for your kind assistance in this matter. Please contact me at 212-313-9067 if you have any questions relating to our request.

Sincerely,



Michael Ravnitzky  
Editor

Encl 1